Specification

FOLDABLE TENT

Field of the Invention

The present invention is related to a foldable tent that is constructed during outdoor events, for example.

Background Art

Conventionally, tents with a structure wherein a covering is supported by a plurality of poles and frames that are connected to the poles have been widely used.

There are various types of structure for the poles and frames, and the structure stated in JP patent No. 2949648 and JP unexamined patent application publication No. 2001-288933 is an example of a foldable tent wherein the poles and frames are supported as they can slide and move rotationally, thus can be folded easily.

These tents 101 shown in FIGs 16 and 17 are provided with juxtaposing outer peripheral frames 103, which link the poles 102 extending upward from the ground or the like where the tent is constructed. The outer peripheral frames 103 are linked by reinforcement frames 104, and a center pole 105 is provided at an intersection of these reinforcement frames 104, that is, the center of a polygon formed by the outer peripheral frames 103.

As shown in FIG. 16, a covering 106 forming a roof of this tent is supported by the outer peripheral frames 103 and the center pole 105.

Since the reinforcement frames 104 in the conventional tent 101 like this are formed parallel to the outer peripheral frames 103, there is a problem regarding the outer peripheral frames 103 that may be twisted subject to an external force such as wind.

The covering 106 is supported by the center pole 105, so the roof having a top is formed with this tent 101 shown in FIG. 16. Because of this, it is possible to prevent water in raining from gathering on the covering during the construction of the tent.

The center pole 105 is supported by the reinforcement frames 104 at the lower

edge, however, since the reinforcement frames 104 are disposed parallel to where the tent 101 is constructed, the length of the center pole 105 should be extended in order to make the top of the roof higher. But excessive lengthening of the center pole 105 may cause less stability in support of the roof against wind and other factors.

In view of the above, an object of the present invention is to provide a foldable tent that has sufficient strength and is simple to assemble, further having stability after construction.

Disclosure of the Invention

In order to solve the above-mentioned disadvantages, an aspect of the invention in claim 1 provides a foldable tent in which a covering is supported by a plurality of poles and a plurality of frames connected to the poles. The frames of the foldable tent are comprised of a plurality of outer peripheral frames that define the outer peripheral shape of the frames and a plurality of reinforcement frames disposed inside of which the outer peripheral frames surround. The outer peripheral frames are disposed on the upper portion of the poles to link the neighboring poles and form a polygon at least with each of the poles positioned at the vertexes of the polygon in a plan view. Each of the poles is provided with the reinforcement frame facing towards a direction of the center of the polygon. A center pole is provided at the center of the polygon and is supported by the reinforcement frames. Each of the outer peripheral frames and each of the reinforcement frames is comprised of two pairs of combined pipe units. At least one intersecting point is formed at each of the pipe units. One of the pipe units and the other pipe unit are joined at the intersecting points to allow rotation. The outer peripheral frames and the reinforcement frames are foldable by means of changing the angle of the pipe units. The covering is supported by the poles, the outer peripheral frames and the reinforcement frames.

An aspect of the invention in claim 2 provides the foldable tent as set forth in claim 1 in which the outer peripheral units on the outer peripheral frames are comprised of a plurality of unit pipe bodies connected at a folding point to allow rotation. Each of the outer peripheral pipe units is formed with at least two intersecting points and with a folding point formed in the manner to be sandwiched by the intersecting points. The unit pipe bodies of one of the outer peripheral pipe units and the other outer peripheral pipe unit are connected at the intersecting points to allow rotation. The outer peripheral frames are foldable at the folding points. The reinforcement pipe units on

the reinforcement frames are comprised of a plurality of unit pipe bodies connected at a folding point to allow rotation. Each of the reinforcement pipe units is formed with at least two intersecting points and with a folding point formed in the manner to be sandwiched by the intersecting points. The unit pipe bodies of one of the reinforcement pipe units and the other reinforcement pipe unit are connected at the intersecting points to allow rotation. The reinforcement frames are foldable at the folding points. The connection point on the upper side of the reinforcement pipe units with respect to the center pole is at a higher position compared to the connection point on the lower side of the reinforcement pipe units with respect to the poles in construction of the tent on a horizontal surface.

An aspect of the invention in claim 3 provides the foldable tent as set forth in claim 2 in which the reinforcement pipe units on the reinforcement frames are comprised of a plurality of unit pipe bodies connected at the folding point to allow rotation. At least one of the unit pipe bodies is disposed level or aslant downward to the direction of the center in construction of the tent on a horizontal surface.

An aspect of the invention in claim 4 provides the foldable tent as set forth in claim 1 in which the connections between the poles and the reinforcement frames and between the center pole and the reinforcement frames are respectively made at two connection points. One of the two connection points is allowed to slide upward and downward as well as to rotate. The other connection point is not allowed to slide upward and downward but to rotate. The length on the pole side is longer than the length on the center pole side regarding the sliding length in the upward and downward direction at one of these two connection points.

An aspect of the invention in claim 5 provides the foldable tent as set forth in claim 1 in which at least one of the connection points for the reinforcement frames is supported to have play that allows movement in the direction to intersect the poles or to intersect the center pole, regarding the connection between the poles and the reinforcement frames and the connection between the center pole and the reinforcement frames.

An aspect of the invention in claim 6 provides the foldable tent as set forth in claim 1 in which the outer peripheral shape defined by the outer peripheral frame is a rectangle formed by two opposing long sides and two short sides disposed at both ends of the long sides.

An aspect of the invention in claim 7 provides the foldable tent as set forth in

claim 1 in which the reinforcement frames are supported at one of the connection points on the pole side and on the center pole side to have play for movement within a specified range in the substantially periphery direction on the basis of the poles or on the center poles.

An aspect of the invention in claim 8 provides the foldable tent as set forth in claim 7 in which each of the pipe units is comprised of a plurality of unit pipe bodies, and, regarding the unit pipe bodies that are supported to have the play with respect to the poles or the center pole, the supporting is made via a bracket provided on the poles or the center pole. The bracket has an inner surface on one side and an opposing inner surface on the other side, and a terminal connection member of the unit pipe body is disposed between the inner surfaces. The unit pipes are pivotally supported by a support pin disposed between the interior surfaces of the bracket to allow rotation around the support pin. The terminal connection member of the unit pipe body has a tapering wedge shape. On one side of the terminal connection member is provided a parallel surface that is parallel in the longitudinal direction of the unit pipe body. On the other side of the terminal connection member is provided a flat sloping surface that diminishes the distance between the parallel surface and the face as it goes towards the terminal side. Wide holes are formed on the terminal connection member in the vertical direction with respect to the parallel surface, penetrating the terminal connection member, and extending in the longitudinal direction of the unit pipe body. The terminal connection member is movable with respect to the bracket within a range from a status where the inner surface of the bracket and the parallel surface touch, while there is a gap between the inner surface on the other side and the sloping surface of the terminal connection member, to a status where there is a gap between the inner surface of the bracket and the parallel surface of the terminal connection member, while the inner surface on the other side and the sloping surface of the terminal connection member touch.

Brief Description of the Drawings

FIG. 1 is a perspective view showing the structure of the tent related to a first embodiment of the invention of this application;

FIG. 2 is a descriptive view showing the structure of the tent of the first embodiment;

FIG. 3 is a descriptive view showing a modified structure of the tent of the first

embodiment;

FIG. 4 is an enlarged descriptive view of the principal part of the tent related to the first embodiment;

FIG. 5(A) is a descriptive view showing the structure of another embodiment of the tent, and FIG. 5(B) is an enlarged perspective view of the principal part showing the I portion of FIG. 5 (A), and FIG. 5(C) is an enlarged perspective view of the principal part showing the II portion of FIG. 5(B);

FIG. 6 is a perspective view showing a folded state of the tent of the first embodiment;

FIG. 7 is a perspective view showing a state in which a reinforcement member is attached to the tent of the first embodiment;

FIG. 8 is a descriptive view showing the operation of the reinforcement member when the tent shown in FIG. 7 is folded;

FIGs. 9(A) and 9(B) are descriptive views showing the tent related to another embodiment of the invention of this application;

FIG. 10 is a perspective view showing the structure of the tent related to a second embodiment of the invention of this application;

FIG. 11 is a descriptive view showing the structure of the tent of the second embodiment;

FIG. 12 is a descriptive view showing the structure of the reinforcement frame related to the second embodiment;

FIGs. 13(A) and 13(B) are descriptive views showing the structure of the end of the reinforcement frame;

FIG. 14 is a descriptive view showing the structure of the reinforcement frame related to the second embodiment;

FIG. 15 is a descriptive view showing the operation of the reinforcement member when the tent shown in FIG. 8 is folded;

FIG. 16 is a perspective view showing a conventional tent; and

FIG. 17 is a perspective view showing the structure of a conventional tent.

Best Mode of Carrying Out the Invention

In the following a first embodiment of the present invention will be described referring to the drawings. FIG. 1 is a perspective view showing the structure of the tent of the embodiment. FIG. 2 is a descriptive view showing the structure of the reinforcement frame.

A foldable tent related to the present invention is supposed to allow easy construction and disassembling outdoors as a temporary tent. Specifically, as shown in FIG. 1, in order to be foldable, the tent is a combination of poles 2, outer peripheral frames 3 and reinforcement frames 4, both of which are connected as frames to the poles 2, and a center pole 5, wherein a covering made of a soft resin or the like is supported over the members, as shown in FIG. 16, thus protecting against sunshine, rain and the like.

A pole 2 is a bar-shaped member with one end disposed on where the tent is constructed such as the ground, and with the other end disposed upward. In this embodiment, four poles 2 are provided for one tent 1, positioned at the vertexes of a substantial square in a plan view, standing upright on the constructing site. For the material of the pole 2, a straight and square pipe is used in this embodiment.

The pole 2 is not limited to this embodiment as described above, and may be modified in various shapes. For example, a curved member may be used, and the members may be disposed in a direction diagonal to the constructing site.

As for the pole 2, a plurality of bar-shaped members that are to be linked may be used. For example, a telescopic extendable system may be employed to have a small diameter member housed inside a larger diameter member. Or a hinge may be provided on a joint of the members to be able to fold them. Or a mating system may be employed to mate the members to extend further. In these cases, a fixing means is provided with the bar-shaped members to be able to adjust the length thereof. As an example for the means, a removable pin is inserted into a hole disposed on the lateral side of respective members. Or a protrusion pressed on by a spring is mated into a hole disposed on the lateral side of at least one of the members. In other words, various modes are employable as long as the outer peripheral frames 3 and the

reinforcement frames 4 described later can be mounted on and the movement of a sliding member 2a that can slide along the poles 2 is not hindered. In this connection, not shown in the figure, the poles 2 of this embodiment are comprised of two bar-shaped members, which a plurality of holes to fix are formed with and the length of which is telescopically adjusted in three ways.

The number of poles for the tent 1 in this embodiment is four, but there is no limitation on this number as long as the poles 2 are three or more and positioned at least at vertexes forming a polygon in a plan view. Consequently, a rectangular shape in a plan view (described in the second embodiment later), a pentagon shape, or a shape consisting of six poles is included in this invention. Further, the poles 2 can be positioned inside the polygon, and the poles 2 provided in this manner can be functioned as a center pole 5 described later.

An outer peripheral frame 3, externally viewed juxtaposing, links the upper portion of the neighboring poles 2. In this embodiment, outer peripheral unit pipe bodies 31a, 31b, 32a, 32b in a straight bar-shape are combined for the outer peripheral frames 3, with the ends of the outer peripheral unit pipe bodies 31a, 31b, 32a, 32b connected to be pivotally supported to allow rotation.

In this embodiment, as shown in FIG. 1, the first outer peripheral unit pipe bodies 31a, 31b and second outer peripheral unit pipe bodies 32a, 32b, all of which have an equal length, are disposed between paring poles 2. The outer peripheral unit pipe bodies 31a, 31b, 32a, 32b, respectively shaped like a straight bar, are combined in pairs in such a manner to be pivotally supported at folding points 31c, 32c to form a V-shaped pipe unit. Thus, two pairs of the pipe units are disposed between the pairing poles 2. One of the two pairs of the pipe units, as a first outer peripheral pipe unit 31, is connected at a first connection point 31d to the upper end of the pole 2 such that the folding point 31c is positioned lower than the first connection point 31d, while the other pair, as a second outer peripheral pipe unit 32, is connected at a second connection point 32d to a sliding member 2a disposed on the pole 2 such that the second connection point 32d is positioned lower than the first connection point 31d of the first outer peripheral pipe unit 31 and such that the folding point 32c is positioned higher than the second connection point 32d. At intersecting points 3a where the first outer peripheral pipe unit 31 and the second outer peripheral pipe unit 32 cross, the outer peripheral unit pipe bodies 31a, 32a on each of the outer peripheral pipe unit 31, 32 are pivotally supported to allow rotation, and each of the outer peripheral unit pipe bodies 31b, 32b are

pivotally supported to allow rotation as well. Consequently, in this embodiment, the two intersecting points 3a are formed on each of the outer peripheral pipe units 31, 32 in the manner to sandwich the folding points 31c, 32c.

Each of the outer peripheral unit pipe bodies 31a, 31b, 32a, 32b are not limited to this embodiment, and can be applied, for example, with a curved member or an outer peripheral pipe unit comprised of more components per a pair of the outer peripheral pipe units 31, 32, thereby having many intersecting points 3a and folding points 31c, 32c as shown in FIG. 10, which shows a second embodiment described later. In contrast to the description above, the outer peripheral pipe units 31, 32 can be respectively comprised of a single outer peripheral unit pipe body and pivotally supported by an intersecting point 3a only, forming an "X" type.

Regarding the connection points 31d, 32d of each of the outer peripheral pipe units 31, 32 to the poles 2, the first connection point 31d is connected by means of, for example, a pivot to allow rotation through a bracket secured to the upper end of the poles 2. The second connection point 32d is connected to allow rotation to a sliding member 2a provided in a manner to allow sliding along the pole 2, for example, by pivotal supporting.

The sliding member 2a in this embodiment has a short cylindrical shape provided such that it encircles the outer periphery of the pole 2, wherein a bracket is also provided for connecting the second outer peripheral pipe unit 32 to the outside of this sliding member 2a. Between the sliding member 2a and pole 2, a detachable fixing means is provided and makes fixing in constructing the tent. An example of the means is a removable pin inserting into a hole formed on the lateral side of each members or a protrusion that is pressed on by a spring disposed on the other side mating into a hole formed on the lateral side of at least either the pole 2 or the sliding member 2a.

The sliding member 2a is not limited to the description above and may have a structure that provides a bracket outside and slide inside the pole 2, and further may be modified to various modes as long as the second connection point 32d can slide along the pole 2.

Owing to the aforementioned structure, the outer peripheral frame 3 is formed in a juxtaposing shape in this embodiment, and each angle of the outer peripheral pipe units 31, 32 is changeable following movement that brings the pair of poles 2 closer and farther apart thereby folding and extending the outer peripheral frame 3.

And, the outer peripheral frame 3 in a plan view forms each side of the polygon with each of the poles 2 positioning at the vertexes thereby defining the outer periphery of the tent 1.

A reinforcement frame 4, positioned inside the above-described polygon formed by the outer peripheral frame 3, is disposed so as to face towards a direction of the center of the polygon. The "center" here does not mean a geometric center in the polygon but means "inside" at most. In this embodiment, since the polygon is substantially a square, the reinforcement frame 4 in a plan view is positioned diagonally as shown in FIG. 5(A). Further, a center pole 5 is provided at the intersecting point of the reinforcement frame 4 being the center of the polygon, thereby supporting the covering. The reinforcement frame 4 is disposed between the pole 2 and the center pole 5, accordingly.

Though each of the reinforcement frames 4 in this embodiment is formed in an equal length, there is no limitation on this and a combination of reinforcement frames 4 with unequal lengths is applicable.

Hereupon, as shown in FIG. 17, since the reinforcement frames 104 in a conventional foldable tent are formed so as to link the outer peripheral frames 103, it is necessary to separately mount another reinforcement member (not shown in the figure) such as a brace on the portion of the polygon that the outer peripheral frames 103 forms for the purpose of providing strength on the portion against shearing deformations, particularly. In this embodiment, however, the reinforcement frames 4 are formed diagonally in a substantial square formed by the outer peripheral frames 3, thereby improving the above-mentioned strength compared to a conventional foldable tent. Consequently, it is not especially required to provide a reinforcement member separately, and when a reinforcement member such as a reinforcement member 6 or a support reinforcement member 6' shown in FIGs. 7 and 10 is provided, the strength can be improved more.

The structure of this reinforcement frame 4 is basically the same as the outer peripheral frame 3 mentioned above, so the principal differences in view of the outer peripheral frame 3 will be described.

As described above, at the intersecting point of the reinforcement frame 4, the center pole 5 is provided that supports the covering. Regarding the tent 1 provided with the center pole 5 like this embodiment, a slant topping the portion supported by the

center pole 5 is provided such that water such as rain does not gather on the covering while constructing the tent 1 in the rain. Thus, it is preferable for the top end of the center pole 5 to be disposed at a higher location. But excessive lengthening of the center pole 5 may cause less stability in support of the covering against wind and other factors.

In contrast to this, as shown in FIG. 2, when the tent 1 in the present invention is constructed on a horizontal surface, a center connection point 41e of the reinforcement frame 4 for the center pole 5 is provided at a higher position compared to the pole side connection point 42d of the reinforcement frame 4 for the pole 2, and the center pole 5 is stably supported. In addition, the inside of the tent can be spacious.

Also, like the outer peripheral frames 3, reinforcement unit pipe bodies 41a, 41b, 42a, 42b comprise the reinforcement frames 4, and are combined in pairs so as to form a V-shaped pipe unit. The two pairs of pipe units are disposed between the pole 2 and the center pole 5. However, these reinforcement unit pipe bodies 41a, 41b, 42a, 42b are different from the outer peripheral unit pipe bodies 31a, 31b, 32a, 32b of the outer peripheral frames 3 and all of them do not have an equal length.

Specifically, as shown in FIG. 2, a pair of the reinforcement frames 4, disposed between the pole 2 and the center pole 5 is comprised of the first pole side reinforcement unit pipe body 41a, the second pole side reinforcement unit pipe body 42a, the first center reinforcement unit pipe body 41b, and the second center reinforcement unit pipe body 42b. The first pole side reinforcement unit pipe body 41a and the second pole side reinforcement unit pipe body 42a are pivotally supported at a pole side intersecting point 4a, while the first center reinforcement unit pipe body 41b and the second center reinforcement unit pipe body 42b are pivotally supported at a center intersecting point 4b.

As is the case of the outer peripheral frames 3, the first pole side reinforcement unit pipe body 41a and the first center reinforcement unit pipe body 41b are pivotally supported at a folding point 41c, thus forming a first reinforcement unit pipe 41, while the second pole side reinforcement unit pipe body 42a and the second center reinforcement unit pipe body 42b are pivotally supported at a folding point 42c, thus forming a second reinforcement unit pipe 42.

Hereupon, in the first reinforcement unit pipe 41, when the length of the intervals defined at the intersecting points 4a, 4b and the folding point 41c are respectively, from the pole side, a first interval L1, second interval L2, third interval L3,

and fourth interval L4, the intervals are formed to be shorter as heading to the center, i.e. L1 > L2, L2 = L3, and L3 > L4 in the present invention. This relation is the same as the second reinforcement unit pipe 42. Consequently, among the distance H1 between the pole side connection point 41d of the first reinforcement unit pipe 41 and the pole side connection point 42d of the second reinforcement unit pipe 42, the distance H2 between the folding point 41c of the first reinforcement unit pipe 41 and the folding point 42c of the second reinforcement unit pipe 42, and the distance H3 between the center connection point 41e of the first reinforcement unit pipe 41 and the center connection point 42e of the second reinforcement unit pipe 42, the relation is H1 > H2 > H3.

The sum of the distance between the first connection point 31d and the intersecting point 3a on the outer peripheral frame 3, and the distance between the second connection point 32d and the intersecting point 3a on the same, and the sum of the distance (first interval L1) between the pole side connection point 41d and the pole side intersecting point 4a on the first reinforcement unit pipe 41 on the reinforcement frame 4, and the distance between the pole side connection point 42d and the pole side intersecting point 4a on the second reinforcement unit pipe 42 on the same, are formed to be equal, whereby the outer peripheral frame 3 and the reinforcement frame 4 move smoothly.

In contrast, the first reinforcement unit pipe 41 is connected to the pole 2 to allow rotation at the pole side connection point 41d on the upper end of the pole 2, and is also connected to the center pole 5 to allow sliding and rotation at the center connection point 41e on the sliding member 5a, the point being provided at higher than the lower end of the center pole 5 and higher than the pole side connection point 41d. This sliding member 5a is the same as the sliding member 2a provided on the pole 2 above.

The second reinforcement unit pipe 42 is connected to the pole 2 to allow sliding and rotation at the pole side connection point 42d on the sliding member 2a (in this embodiment, the outer peripheral frame 3 shares this sliding member 2a), the point being provided lower than the pole side connection point 41d connecting to the first reinforcement unit pipe 41, and is also connected to the lower end of the center pole 5 to allow rotation at the center connection point 42e on the lower end of the center pole 5, the point being provided at higher than the pole side connection point 42d.

Here, regarding the pole 2, the pole side connection point 41d of the first reinforcement unit pipe 41 is provided higher than the pole side connection point 42d of

the second reinforcement unit pipe 42, while, regarding the center pole 5, the center connection point 41e of the first reinforcement unit pipe 41 is provided higher than the center connection point 42e of the second reinforcement unit pipe 42.

As described above, when folding and extending the reinforcement frame 4, like the outer peripheral frame 3, the center connection point 41e on the sliding member 5a slides up and down along the center pole 5 as does the pole side connection point 42d on the sliding member 2a along the pole 2. Regarding the moving length of each of the connection points 41e, 42d, it becomes larger on the pole 2 side than on the center pole 5 side. Especially in constructing the tent, owing to this, the principle of leverage applies to lifting the center pole 5 with a small effort, facilitating to spread the covering, thereby readily opening and closing the tent 1. The same effect can also be obtained by a structure that functions the same, such as three reinforcement unit pipe bodies in the second embodiment described later or a plurality of reinforcement unit pipes more than this, so it is not limited to each of the reinforcement unit pipe 41, 42 comprised of two reinforcement unit pipe bodies in this embodiment.

Also, in this embodiment, the first pole side reinforcement unit pipes 41a and the second center reinforcement unit pipes 42b are disposed level to the constructing site when the tent 1 is constructed. Although this portion is designed to face upwards 1 to 2 degrees above the horizontal, it becomes level when the tent 1 is actually constructed because of deviations due to the weight of each reinforcement unit pipe 41, 42 and wide holes 41f, 42f (41h, 42h) described later.

In contrast, the second pole side reinforcement unit pipe body 42a and the first center reinforcement unit pipe body 41b, which are respectively combined to the reinforcement unit pipes 41a, 41b, are disposed aslant upward to the center with respect to the constructing site.

In this invention, each of the reinforcement unit pipe bodies 41a, 42b are not limited to being disposed level as in this embodiment, but may be disposed aslant downward to the center. Also, one of the reinforcement unit pipe bodies 41a, 42b may be disposed level or aslant downward. Owing to this, the folding point 41c of the first reinforcement unit pipe 41 is smoothly folded such that it goes downward when the neighboring poles 2 are retracted in disassembling the tent 1.

Hereupon, a modified example of this embodiment is shown in FIG. 3 for comparison. Different from the above-mentioned structure shown in FIG. 2, this is formed in a manner that the reinforcement frame 4 is directed upward. In this

embodiment, it concerns that folding of the reinforcement unit pipes 41, 42 of the reinforcement frame 4 may cause scratching in disassembling the tent 1. Contrary to this, the structure of the reinforcement frame 4 shown in FIG. 2 has an advantage to achieve a smooth disassembling without hindering that may occur.

And, the second reinforcement unit pipe 42 in this embodiment has a trapezoid shape in a side view and stable strength to support the tent.

Further, as shown in FIG. 4, on the end of the center pole 5 side of the reinforcement unit pipe bodies 41b, 42b is respectively formed with wide holes 41f, 42f that extend in the lengthwise direction of the pipes 41b, 42b in this embodiment, said pipe bodies 41b, 42b are respectively, through the wide holes 41f, 42f, supported pivotally to the sliding member 5a at the center connection point 41e and to the center pole 5 at the center connection point 42e. In other words, at each of the connection points 41e, 42e are pivotally supported to be movable along the lengthwise direction of each of the reinforcement unit pipe bodies 41b, 42b, the direction being intersecting the center pole 5.

Here, since the outer peripheral frames 3 in a plan view are positioned in a manner to correspond to the sides of a substantial square, while the reinforcement frames 4 diagonally corresponds to the substantial square, and slant towards the center pole 5 as a whole, the frames 3, 4 move differently in constructing and in disassembling the tent 1, that is, the moving lengths of the frames 3, 4 differ. Consequently, it may cause trouble moving smoothly with deviations, or further may be unable to fold, if a connection between the reinforcement frame 4 and the pole 2 or the center pole 5 is made only to allow rotation.

As described above, the wide holes 41f, 42f respectively provided at the connection points 41e, 42e can resolve the deviations and achieve a smooth operation. Because of this, these wide holes 41f, 42f are a very important mechanism to fold the tent 1. The strength of the entire tent 1 is also improved.

The dimensions of the respective wide holes 41f, 42f can be suitably set as long as they resolve the deviations in the connection points 41e, 42e. Specifically, based on the diameter of the pins that pass through the wide holes 41f, 42f, it is suitable for the dimensions to be formed 1.5 to 10 times, preferably 2.5 to 4 times. Represented by dimensions, it is 3 mm to 30 mm, preferably 6 mm to 18 mm.

Contrary to this, as shown in Fig. 5(A), the portion I located on the center connection point 41e, 42e side can be round holes 41f, 42f as shown in Fig. 5(B), while the portion II located on the pole side connection points 41d, 42d can be wide holes 4h, 42h, as shown in Fig. 5(C). It is more advantageous that the portion II makes wide holes than that the portion I makes wide holes as the description above, because the wide holes can be formed short. Wide holes can be also formed at both portions I and II, and various modifications may be made as long as the reinforcement frame 4 is supported to be movable in a direction that intersects the poles 2 or the center pole 5.

In this embodiment, wide holes are provided on the reinforcement pipe units 41, 42 side, however, contrary to this, the same effects can be obtained when round holes are provided on the reinforcement pipe units 41, 42 side and wide holes are provided on the poles 2 or the center pole 5 for pivotal supporting. A means other than wide holes can be used as long as the center connection points 41e, 42e or the pole side connection points 41d, 42d are pivotally supported to be movable.

The center pole 5, as shown in Fig. 2, is supported by the reinforcement frame 4 and is a bar-shaped member disposed upright in this embodiment.

Additionally, a covering in the shape of a sheet is disposed so as to cover the poles 2, the outer peripheral frame 3, and the center pole 5, and the center pole 5 is to be the top of the roof of the tent 1.

Since the center pole 5 is supported by the reinforcement frame 4 that slants as described above, the length of the center pole 5 can be made relatively shorter, thereby supporting the top of the roof of the tent 1 stably.

Next, a construction way of the tent 1 related to this embodiment will be described. The frame in the folded state as shown in Fig. 6 is placed such that the poles 2 stand upright. For explanation, the covering is omitted in Fig. 6.

Then, the poles 2 are spread radially, i.e. in the back and forth and right and left directions. This allows to extend the outer peripheral frame 3 and the reinforcement frame 4 that have been juxtaposingly folded.

Since the reinforcement frame 4 is formed aslant upwards to the center, the center pole 5 supported by the reinforcement frame 4 in the center is lifted upward as the reinforcement frames 4 are extended.

This stretches the covering that is attached to the poles 2, the outer peripheral frame 3, and the center pole 5.

Then, the poles 2 are extended and the roof with the covering is lifted as necessary. The tent 1 is constructed by these operations.

The lower end of the poles 2 may be just placed on the constructing site such as the ground, however, they can be fastened, for example, by a peg to the constructing site or put on by weights in order not to move due to wind and the like.

As described above, since the foldable tent 1 in the present invention can be constructed simply to extend the poles 2, it is possible to construct it by at least two people.

When the tent 1 is disassembled, it can be done by reversing the described process. Respective bar-shaped members constituting the poles 2 (in such a case a plurality of bar-shaped members are combined in a telescopic manner), and the poles 2 and the sliding members 2a are secured by pins or the like in the constructed status, so the securing member is to be disengaged in the disassembling operation.

Here, as depicted in the description regarding the reinforcement frame 4, the first pole side reinforcement unit pipes 41a and the second center reinforcement unit pipes 42b are disposed level to the constructing site when the tent 1 is constructed, and when the poles 2 are contracted in disassembling the tent 1, the folding point 41c of the first reinforcement unit pipe 41 is folded such that it goes downward, enabling a smooth disassembling operation.

For the material of the poles 2, outer peripheral frames 3, and reinforcement frames 4 of the foldable tent 1 in the present invention, various materials may be used such as steel that has been treated anti-corrosion by painting, plating and the like, aluminum alloy, or plastic. Also, in this embodiment, hollow angled pipes are used, however, round pipes can be used. In the case of light material such as plastic, solid one may be used instead of hollow pipe. Taking weight, strength, durability, costs and other factors into general consideration, as described above, most appropriate materials may be applied depending on needs of uses or their purposes.

Though sufficient in the above-described structure, as shown in FIGs. 7 and 10,

the strength can be further improved by adding to the tent 1 of this embodiment a reinforcement member 6 that links the outer peripheral frame 3 and the center pole 5.

The reinforcement member 6 shown in FIG. 7 is a bar-shaped member with one end connected to the sliding member 5a and the other end to the folding point 31c on the lower side in the figure of the outer peripheral frame 3, and when the tent 1 is folded, the one end of this reinforcement member 6 goes up and the other end goes down, as shown in FIG. 8.

Also, the reinforcement member 6 shown in FIG. 10 can be folded at folding point 6a into a V-shape and folded. Among the members, regarding the reinforcement member 6 disposed parallel to the long side of the outer peripheral frame 3, one end thereof is connected to the sliding member 5a with the other end connected to the intersecting point 3a positioned at the center of the short side of the outer peripheral frame 3, while, regarding the reinforcement member 6 disposed parallel to the short side of the outer peripheral frame 3, one end thereof is connected to the sliding member 5a with the other end connected to the folding point 31c on the upper side in the figure positioned at the center of the long side of the outer peripheral frame 3. As shown in FIG. 15, the folding point 6a of this reinforcement member 6 goes down in folding the tent 1.

Both embodiments of the reinforcement member 6 described above can be applied to the tent 1 of a first embodiment 1 (see FIG. 7) and to the tent 1 of a second embodiment (see FIG. 10) described later.

This reinforcement member 6 may be formed in a juxtaposing shape like the outer peripheral frame 3 and the reinforcement frame 4 described above.

As shown in the dotted lines in FIGs. 5(A), 7 and 10, a supplemental reinforcement member 6' can be provided other than the reinforcement member 6. Regarding a supplemental reinforcement member 6' shown in FIG. 7, one end thereof is connected to the sliding member 5a with the other end connected to the intersecting point 3a of the outer peripheral frame 3, while, regarding a supplemental reinforcement member 6' shown in FIG. 10, one end thereof is connected to the sliding member 5a with the other end connected to the folding point 32c of the outer peripheral frame 3. Like the reinforcement member 6, the supplemental reinforcement member 6' may be variously modified, for example, as one-piece bar-shaped member, a member that can be folded into a V-shape and folded, or in a juxtaposing shape.

As for the reinforcement member 6 shown in FIG. 10, a stopper 6b is provided

in a manner to wrap the folding point 6a, and sliding of the stopper 6b along the reinforcement member 6 can switch the reinforcement member 6 between in a secured state and in a foldable state, whereby the reinforcement member 6 is not going to fold accidentally in constructing the tent 1.

In this embodiment, the poles 2 and the outer peripheral frame 3 are formed in a substantial square in a plan view, however, it is not limited to this, and, as shown in FIGs. 9(A) and 9(B), a plurality of the tent 1 shown in FIG. 1 can be connected into a various of polygons (a linking type) such as a rectangle or hexagon to share the sides. Also, the tent 1 may be modified to have a structure to be provided with a linking member to link a plurality of tents 1 only as needed.

A second embodiment of the present invention will be described here with the tent 1 being a single type like one shown in FIG. 1, not the aforementioned linking type shown in FIG. 9, and has a rectangular shape in a plan view. FIG. 10 is a descriptive view showing a structure of the tent 1 in this embodiment, and FIG. 11 is a descriptive view showing a structure of the reinforcement frame 4. Since the structure of the tent 1 of the second embodiment is basically the same as the first embodiment described above, the differences to the first embodiment will be mainly described.

In the second embodiment, since the length of the long sides is longer than the short sides in a plan view, the outer peripheral frame 3 is comprised of more components of outer peripheral pipe units 31, 32 on the long side than the first embodiment. Specifically, as shown in FIG. 10, each of the two pairs of the outer peripheral pipe units 31, 32 provided between pairing poles 2 includes four of the intersecting points 3a and three of the folding points 31c, 32c.

Likewise, the reinforcement frame 4 positioned diagonally in a rectangle is comprised of more components of reinforcement pipe units 41, 42 than the first embodiment. Specifically, as shown in FIG. 11, the reinforcement frame 4 is comprised of a first pole side reinforcement unit pipe body 41a, second pole side reinforcement unit pipe body 42a, first intermediate reinforcement unit pipe body 41b, second intermediate reinforcement unit pipe body 42b, first center reinforcement unit pipe body 41g, and second center reinforcement unit pipe body 42g. Between the first pole side reinforcement unit pipe body 41a and the second pole side reinforcement unit pipe body 42a, they are pivotally supported at a pole side intersecting point 4a to allow

rotation, as between the first intermediate reinforcement unit pipe body 41b and the second intermediate reinforcement unit pipe body 42b at an intermediate intersecting point 4b, and as between the first center reinforcement unit pipe body 41g and the second center reinforcement unit pipe body 42g at a center intersecting point 4c. Further, the first pole side reinforcement unit pipe 41a, first intermediate reinforcement unit pipe 41b, and first center reinforcement unit pipe 41g are pivotally supported at folding points 41c, 41c to allow rotation to comprise the first reinforcement pipe unit 41, while the second pole side reinforcement unit pipe 42a, second intermediate reinforcement unit pipe 42b, and second center reinforcement unit pipe 42g are pivotally supported at folding points 42c, 42c to allow rotation to comprise the second reinforcement pipe unit 42.

Here, as for a trial tent 1 the inventor produced with different lengths between the short sides and the long sides of the outer peripheral frame 3 as described in this embodiment, folding of the tent caused trouble, when the poles 2 were not moved for a distance as per a ratio between the short sides and the long sides, of hindering with of the reinforcement frame 4, thus failing in smooth folding, or being unable to be folded, resulting in non-usability.

In the second embodiment, in order to solve this problem, a terminal connection portion 7 (see FIG. 12) of the poles 2 and the center pole 5, the portion being both ends of the first reinforcement pipe unit 41 and second reinforcement pipe unit 42 on the reinforcement frame 4, in addition to a structural pattern in the first embodiment, has play for movement within a specified range in the substantially peripheral direction on the basis of the poles 2 and the center pole 5 to be able to move like turning a head. Specifically, the terminal connection member 7 having a tapering wedge shape shown in FIG. 12 is pivotally supported with the poles 2 or the center pole 5 through a wide hole 7c formed so as to penetrate the terminal connection member 7 shown in FIGs. 13(A) and 13(B). Regarding the above-described wedge shape, on one end of the terminal connection member 7 is disposed a parallel surface 7a that is parallel to the longitudinal direction of each of the unit pipe bodies 41a, 42a, 41g, 42g that have the terminal connection member 7, while on the other end is disposed a flat sloping surface 7b that diminishes the distance between the parallel surface 7a and the face as it goes towards the terminal side. The wide hole 7c, which is the same as the wide holes 41f, 42f described in the first embodiment, is formed in the vertical direction with respect to the parallel surface 7a and extends in the longitudinal direction of each of the unit pipe

bodies 41a, 42a, 41g, 42g.

In respect of the poles 2 and on the sliding member 2a on the pole side, a bracket 21 is provided with the pole side connection point 41d of the first reinforcement unit pipe 41 to the pole 2, and with the pole side connection point 42d of the second reinforcement unit pipe 42 to the pole 2, as well as, in respect of the center pole 5 and on the sliding member 5a on the center pole side, a bracket 51 is provided with the center connection point 41e of the first reinforcement unit pipe 41 to the center pole 5, and with the center connection point 42e of the second reinforcement unit pipe 42 to the center pole 5. As shown in FIGs. 12 and 14, the bracket 21, 51 respectively has an inner surface 21a, 51a on one side and the other inner surface 21b 51b opposing thereto, where the above-described terminal connection member 7 positioned between both surfaces is pivotally supported to allow rotation by a support pins 21c, 51c disposed therebetween.

Thanks to the shape of the terminal connection member 7 and pivotal support through the wide hole 7c, since the reinforcement frame 4 is movable like turning a head within a range from a status where, as shown in FIG. 12, the inner surface 21a, 51a of the bracket 21, 51 and the parallel surface 7a of the aforementioned terminal connection member 7 touch while there is a gap between the inner surface 21b, 51b on the other side and the sloping surface 7b of the terminal connection member 7, to a status where, as shown in FIG. 14, there is a gap between the inner surface 21a, 51a of the bracket 21, 51 and the parallel surface 7a of the terminal connection member 7 while the inner surface 21b, 51b on the other side and the sloping surface 7b of the terminal connection member 7touch, the tent can be smoothly folded even if a ratio of the movement distance regarding the poles 2 in folding the tent 1 does not follow the ratio between the short sides and long sides. Therefore, the terminal connection member 7 in this type of shape is a highly important mechanism to fold the tent 1. Also, the overall strength of the tent 1 is improved.

In this second embodiment, the terminal connection member 7 in a wedge shape like the above description is provided on both the poles 2 side and the center pole 5 side, however, the terminal connection member 7 can be provided only on the poles 2 side or the center pole 5 side.

The above-described structure achieves similar effects even with a tent in a substantial square in a plan view as in the first embodiment. The structure is

applicable to a tent 1 that has various polygonal shapes besides a rectangle and can flexibly correspond to various purpose of use of the tent 1.

Also, FIG. 10 shows that a reinforcement member 6 that links the outer peripheral frame 3 and the center pole 5 is provides, however, as described, the present invention does not concern whether the reinforcement member 6 is present or not, and the member may be omitted. In contrast, a supplemental reinforcement member 6' shown in a dotted line in FIG. 10 can be also provided.

The present invention has the following excellent effects.

According to an aspect of the invention in claim 1, compared to a conventional tent, the strength is improved by the reinforcement frames being formed that passes through the inside of a polygon in a plan view formed by the outer peripheral frame and being disposed to link each of the poles and the center of the polygon. Thus, it is not necessary to separately provide a reinforcing material as is done conventionally, however, if a reinforcing material is provided, the strength can be improved more.

According to an aspect of the invention in claim 2, in addition to the effect in claim 1, the connection point positioned on the upper side of the reinforcement frame with respect to the center pole is at a higher position compared to the connection point on the lower side of the reinforcement pipe units with respect to the poles, and the center pole is stably supported.

According to an aspect of the invention in claim 3, in addition to the effect in claim 2, since one portion of the bar-shaped member comprising the reinforcement pipe unit is disposed level or aslant downward to the direction of the center, the reinforcement pipe units are smoothly folded in dissembling the tent.

According to an aspect of the invention in claim 4, in addition to the effect in claim 1, since the length on the pole side is larger than the length on the center pole side regarding the sliding length at the connection point of the reinforcement frame, the principle of leverage applies to lifting the center pole with a small effect, facilitating to spread the covering in constructing the tent.

According to an aspect of the invention in claim 5, in addition to the effect in claim 1, since the reinforcement frames are supported to be movable in the direction to intersect the poles or to intersect the center pole at the connection point thereof, deviations in operation on the outer peripheral frame and the reinforcement frame can

be absorbed, and smooth operation in constructing and dissembling the tent can be achieved.

According to an aspect of the invention in claim 6, in addition to the effect in claim 1, a rectangular foldable tent can be provided that can flexibly correspond to various usage objectives of the tent.

According to an aspect of the invention in claims 7 and 8, in addition to the effect in claim 1, the tent can be smoothly folded even when the ratio of the movement distance of the poles is not as per the ratio between the short sides and the long sides in folding the tent.